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ABSTRACT

Costing has been recognized by business, financial, and other administrators in higher education as a valuable management tool. A growing interest in the determination of costs and their use revealed a lack of uniformity in cost definitions and cost determination methods and approaches in a language that was readily applicable to higher education. There was also misunderstanding about cost analysis and costing standards for higher education. Discussed are fundamental considerations for determining cost information, an examination of different cost methods and the conditions under which each is appropriate, and a statement of costing standards applicable to higher education. Evaluation of the quality and efficiency of academic programs involves much more than the use of cost information. Definitions of the quality and efficiency of academic programs have not been developed and accepted on a national basis. Cost data should be related to the characteristics, the state mission, and the goals and objectives of an institution. Numerous judgments, in addition to objective, quantifiable data, are required in determining costs. (Author/KE)

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Fundamental Considerations For Determining Cost Information In Higher Education

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Preface

Over the years, costing has been recognized by business, financial, and other administrators in higher education as a valuable management tool. A growing interest in the determination of costs and their use led the National Association of College and University Business Officers (NACUBO), as a professional association of business and financial officers, to examine the state of the art of cost determination in higher education. The examination indicated a lack of uniformity in cost definitions and cost determination methods and approaches in a language that was readily applicable to higher education. In addition, there were misunderstandings about cost analysis. Finally, costing standards for higher education needed to be codified. This document presents a discussion of fundamental considerations for determining cost information, an examination of different cost methods and the conditions under which each method is appropriate, and a statement of costing standards applicable to higher education. It provides a foundation for the development of costing procedures.

Financial accounting involves the recording and reporting of revenue and expenditure transactions, whereas cost accounting involves the assignment of costs to units of service. Cost determination utilizes information contained in financial accounting records as well as other appropriate sources. Cost accounting incorporates data other than those normally recorded in financial records. Statistical information about students, faculty, programs, and space, as well as other statistical and financial data, is required in the cost determination process.

Evaluation of the quality and efficiency of academic programs involves much more than the use of cost information. Definitions of the quality and efficiency of academic programs have not been developed and accepted on a national basis.

The development of a set of uniform costing procedures that would be equally appropriate for all institutions is unlikely. Cost data should be related to the characteristics, the stated mission, and the goals and objectives of an institution. Numerous judgments, in addition to objective, quantifiable data, are required in determining costs. Many of these judgments are influenced by the characteristics of an institution. A series of judgments applicable to one institution thus may not be appropriate for another.

The interest in acquiring unit cost information is increasing rapidly and needs to be addressed thoughtfully. The response lies in the development of cost information within tolerable margins of accuracy acceptable for the purposes intended and in the education of users in the analytical methods and interpretations of the information so developed. It is hoped that this document will result in an improved understanding of costing standards applicable to higher education.

August 28, 1975

NACUBO Costing Standards Committee

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Fundamental Considerations for Determining Cost Information in Higher Education

FOR MANY YEARS cost information and cost analysis have been recognized by administrators in higher education as useful tools in managing the internal affairs of their institutions. More recently, federal, state, and other funding and policy-setting bodies have indicated additional needs for cost information, especially in the process of appropriating and granting funds to higher education.

For cost information to be useful, it is essential that the fundamentals for determining and using costs be understood. Heretofore, these fundamentals have not been compiled as a basis for developing cost information in higher education.

In formulating fundamental considerations for the development and use of costs, higher education has available the existing body of knowledge already developed, tested, and proven in areas other than higher education. After appropriate modifications, such cost fundamentals are helpful in identifying how cost can be determined and applied by institutions of higher education. However, in applying such fundamentals, consideration should be given to the particular characteristics and objectives of these institutions.

The determination of cost information is a process of approximation, and requires the individual performing cost determinations to exercise judgment based on circumstances relevant to the purposes for which cost information is collected. Different cost results occur even when equally valid alternative approaches are used. Determination of the approach is often based on practicability, as long as the results are valid and meaningful for the purposes intended.

There have been attempts to use a single methodology for determining cost to satisfy a wide variety of purposes for which cost information is used. This chapter indicates the need for different cost determination methods and approaches to satisfy the variety of purposes for determining cost rather than using a single method for all purposes. It describes the available methods, approaches, and related considerations for determining costs.

In order to place in perspective the various aspects of costing described in the sections that follow, it is well to visualize the complete costing process. The term "costing" is used here to denote the cost determination process. The essential factors involved in determining costs in higher education and their interrelationships are shown in the exhibit on the following page.

Foremost among these factors are costing standards to be applied in determining cost; they serve as the foundation on which costing is performed. Before costing can begin, however, it is necessary that the purposes of cost information be clearly identified. Once the purposes are defined, then the definitions of cost, the cost objectives and costing units, the types and classifications of cost, and the financial accounting and statistical data to be used to provide the desired cost information can be specified.

At this stage the appropriate cost determination methodology should be formulated. The methodology can be either the specific service method (job order method), the continuous service method (process method), or a combination of the two methods. These methods are described in detail in the section "Cost Determina-

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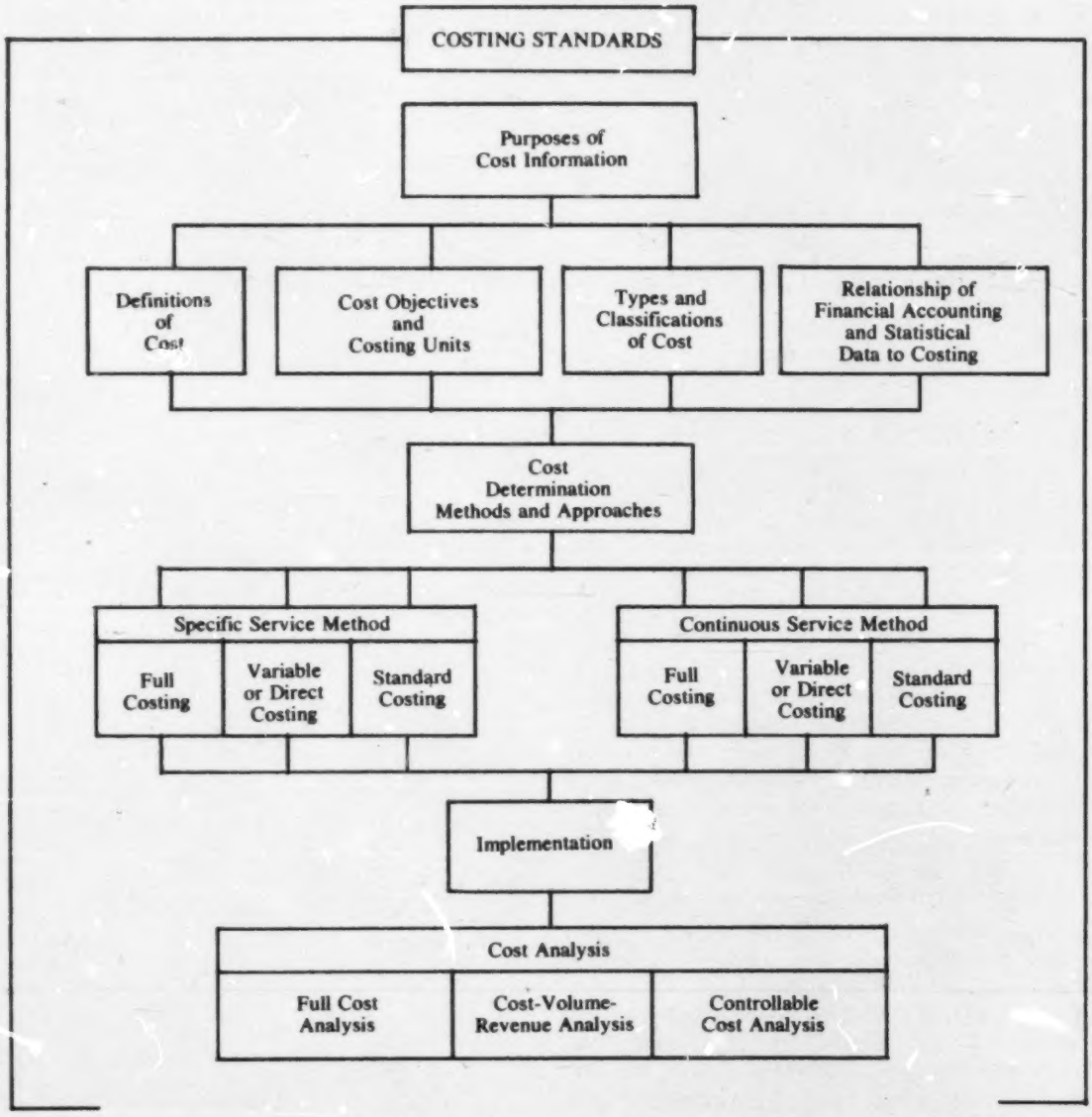

tion Methods and Approaches." Within these methods full costing, variable or direct costing, or standard costing approaches can be employed. Based on the methodology selected, costing procedures are implemented. The resultant cost information serves as the subject of cost analysis, which is the process of examining cost and statistical information and deriving meaning to satisfy the needs of users. The three basic cost analysis categories are full cost analysis, cost-volume-revenue analysis, and controllable cost analysis.

PURPOSES OF COST INFORMATION

There are many purposes for determining cost information to satisfy both internal and external requirements. It is essential that the purpose of obtaining cost information be identified at the outset in order that appropriate definitions and methods of costing can be selected.

For a college or university, cost information is used for purposes of assisting in planning and budgeting, in controlling, and in evaluating performance. The process of planning and budgeting is designed to formulate the approach to be followed by an institution in achieving its long-term mission and shorter-term goals and objectives. In the planning and budgeting process, cost information is one factor used in examining alternatives, determining the cost requirements of each alternative, and selecting those alternatives consistent with the most effective utilization of available resources. Cost information may be used in modifying the budget plan during the operating period by indicating the cost consequences of proposed actions in view of changes in priorities, economic conditions, and other circumstances that could not have been foreseen during the planning and budget process.

In controlling current operations, cost information is a valuable indicator for identifying areas in which current budgetary adjustments may be required or corrective actions needed. The control process involves the comparison of incurred cost to budgeted cost. Variances identified in the control process are examined to determine the appropriate action to be taken.

Cost information is one among many important aspects in the evaluation of performance. Evaluation involves an after-the-fact examination of results and assists in determining whether the educational and related activities conducted were as effective as anticipated and whether institutional resources were appropriate to support these activities. By comparing the results of operations to the original plan, areas can be identified in which adjustments may be needed in future planning and budgeting. Cost information also is used in determining interdepartmental charges in the financial accounting system.

Cost information is used by federal, state, and local bodies responsible for appropriating public funds. Foundations and other granting bodies also are interested in cost information. Through the years, these granting bodies have been interested in cost information (and other information) to assist them in determining whether they will use their funds to support a need. This information also has been used by granting bodies to reimburse direct and indirect costs related to grants and contracts for specific programs. Certain governmental and private funding agencies have established required costing procedures for reimbursement purposes.

COSTING TERMS

For the purpose of determining cost information, it is necessary to establish definitions of cost and their relationship to cost objectives and costing units.

Definitions of Cost

The term "cost" is defined in different ways, depending on the objectives for which costs are determined. Three commonly used definitions of cost are derived from financial accounting, cost accounting, and economics.

Financial accounting is concerned with recording, classifying, summarizing, and analyzing financial data. The financial accounting definition treats cost as the amount or equivalent paid or charged for something of value. In this sense, cost represents the total value sacrificed to obtain assets and to receive goods and services. Another term very much a part of the cost concept is "expense." For financial accounting purposes, expense is the expired portion of cost applicable to a specific period. Therefore, the cost of acquired assets that benefit future periods, such as inventories and capital assets, is not considered an expense at the time of acquisition, but is deferred until the assets are used. The term "expense" should not be confused with the term "expenditure." Expenditures include all expenses except depreciation and also include the acquisition cost of capital assets.

Cost accounting is concerned with accumulating, classifying, summarizing, interpreting, and reporting the cost of personnel, goods and services, and other expenses incurred to determine unit costs. Expenses incurred during a specified period, as defined by financial accounting, are the prime ingredient of cost accounting for cost determination purposes. The costing process is designed to assign or allocate costs to particular units of service provided. The costs derived may be actual costs or may be other costs such as replacement, projected, or imputed costs. The primary difference between cost accounting and

financial accounting is that the former involves obtaining unit cost information and the latter involves obtaining costs primarily by organizational unit and function.

In economics, cost can be viewed from the "macro" or "micro" point of view. The macro definition of cost typically considers society as a whole rather than focusing attention on a particular institution. For example, the economist considers opportunities sacrificed by the community at large as societal costs external to the institution. On the other hand, the micro definition of cost used in economics focuses on the activities of an organization. This definition, in addition to considering expired cost (expense), may include other costs such as replacement, projected, or imputed costs. This latter definition is similar to that often used in cost accounting.

The definition of cost depends on the purposes for which cost information is to be used. There is no single definition of cost that will satisfy the variety of needs for cost information. Accordingly, significant differences in cost information will be derived, depending on the selection of cost definitions used for different purposes.

Cost Objectives and Costing Units

A cost objective is a defined entity to which cost is related, and can be an organizational unit, a project, responsibility center, function, program, or some other identifiable entity. Cost is accumulated and assigned to cost objectives for purposes of measuring the cost of processes or specific services. The cost objectives used in the costing process are based on the purposes for which cost information will be used and the level of cost aggregation desired. Different costs, and therefore different cost objectives, are required for different purposes.

Costing units are measures reflecting the activities or outputs of cost objectives, and bear a relationship to the incurrence of cost.

In commercial organizations, cost generally can be assigned to well-defined and measurable products or services. In higher education, however, the services of instruction, research, and public service may not be measurable or separable in terms of units of output. For example, the instructional process produces an output sometimes referred to as an acquired body of knowledge; however, there is no consensus on how to measure the acquired knowledge as an output. Full-time-equivalent students, student credit-hours, student contact-hours, student headcount, student major by level, and degrees awarded are examples of costing units of service used to measure the instructional process in lieu of output measures. These units are not measures of quality or efficiency.

Measurable units of output are available for certain support activities such as meals served in food service facilities, jobs run by computer centers, and pounds of steam produced by heating plants.

Types and Classifications of Cost

Depending on the intended use of cost information, one type of cost or a combination of types of cost may be employed. Five basic types of cost are:

1. Historical cost.
2. Projected cost.
3. Standard cost.
4. Replacement cost.
5. Imputed cost.

For certain cost determination purposes, components of the above types of cost may be classified as either direct or indirect. For other cost determination purposes, components may be classified as fixed, variable, or semivariable.

Historical Cost. Historical cost usually is expressed in terms of the monetary value of economic resources released to pay faculty and staff salaries, to acquire materials and services, and to utilize facilities. Historical cost results from an expenditure involving the disbursement of cash or incurrence of a liability.

The two methods of determining historical cost are referred to as the cash basis and the accrual basis. The cash basis of accounting recognizes revenues when cash is received and expenditures when cash is paid, whereas accrual accounting recognizes revenues when earned and expenditures when materials are used and services are performed. To provide valid and consistent historical cost information, college and university accounting standards, as promulgated by authoritative bodies, require that accounting records and resulting financial statements be based on the accrual method of accounting. For cost

determination purposes, the accrual basis should be used. In this regard, an important concept inherent in accounting and costing is materiality, which provides that it is not necessary to recognize certain items of expense and revenue if their omission does not have a significant effect on the final results.

Projected Cost. Projected cost for an educational institution is an estimate of the cost to be incurred in a future period. Changes anticipated in programs, student demand, faculty mix, faculty workload, support required, salary rates, and economic conditions all affect cost expectations. Projected cost is based on available knowledge about past activities, along with expectations of new and planned activities and the effect of changing conditions on cost.

Standard Cost. Standard cost is a predetermined cost, used as a target or basis of comparison with actual cost when units of service are provided. Establishment of standard cost involves a detailed examination of past occurrences and an evaluation of expectations to establish meaningful standards of performance. Standard costs may be developed by estimating costs based on historical experience or based on special studies.

Replacement Cost. Replacement cost refers to that cost which would be incurred at present or in the future to construct or acquire physical facilities or to purchase comparable services and materials to replace those obtained in the past. Replacement cost is not recorded as part of the financial accounting system. It may be used to measure the effects of inflation or deflation against the original cost incurred.

Cost viewed in terms of replacement highlights the fact that an institution is utilizing assets purchased in the past, which may be replaced at a cost different from historical cost. Because of changing price levels, recognition of historical cost alone may misrepresent the cost if replacement is considered. Therefore, since certain assets presumably will be replaced by an institution, replacement cost is measured at the current or future market level.

Imputed Cost. Imputed cost relates to potential resources that would have been available to an institution, but that were forgone because one alternative was chosen over another. Imputed cost does not consider the past, present, or eventual disbursement of cash or its equivalent, but rather is concerned with measuring the cost of alternative opportunities. By considering forgone resources as a cost, management is able to evaluate the imputed cost of one alternative versus another.

An example of imputed cost is the interest income forgone by an institution, which could have been earned if the funds utilized for a particular activity had been invested. This imputed cost represents economic resources forgone by an institution in selecting one alternative over another.

Direct Costs and Indirect Costs. For cost determination purposes, components of cost may be classified into direct costs and indirect costs. Direct costs are those expenses that are readily identifiable with a cost objective. For example, where the chemistry department is the cost objective, identifiable faculty compensation and supplies associated with teaching chemistry courses are direct costs of the department.

Indirect costs are those costs not readily identifiable with a cost objective. Indirect costs of a chemistry department include an allocated portion of the expenses of the president's office, libraries, and operation and maintenance of plant. These costs are incurred for more than one cost objective and are not readily related in a direct fashion to each cost objective.

The distinction between direct and indirect cost has to be judgmental in many cases. A major factor in distinguishing between direct and indirect cost is the level of aggregation of the cost objective. For instance, a portion of the compensation paid to a chemistry department chairman may be considered an indirect cost of a chemistry course. However, if the cost objective is the chemistry department as a whole, instead of the individual courses conducted by the department, the cost of the department chairman is direct.

The determination of whether cost is direct or indirect also is affected by the practicality of assigning costs directly to the cost objective to achieve greater precision. In many situations, much effort is required to relate cost directly to the cost objective, with the results not being materially different from the identification of cost as indirect. Therefore, an important factor for

consideration in the assignment of costs is the added expense of identifying costs as direct rather than indirect. The expense of making a precise assignment of costs as direct must be weighed against the precision required in satisfying the purpose for which cost information is used.

Other factors affecting the distinction between direct and indirect cost include the individual judgments that must be exercised in classifying costs and the differences among institutions, such as organizational structure and operating policies.

Fixed, Variable, and Semivariable Costs. Components of cost also may be identified as being fixed, variable, or semivariable (also referred to as mixed or step-variable) costs. Total variable costs fluctuate in direct proportion to the volume of units of service provided. Total fixed costs, on the other hand, remain constant over a period regardless of the number of units of service provided. Semivariable costs include both fixed and variable elements, the fixed portion relating to capacity and the variable portion depending on usage. These semivariable costs typically react to volume changes in an irregular fashion; thus, cost that is fixed for a certain range of units of service becomes variable as that range is exceeded.

Certain costs are classified as fixed because of policy decisions of an institution, and may be further referred to as committed or discretionary. Committed fixed costs are those that must be expended because of existing contractual arrangements, plant facilities, and other activities that are necessary to maintain a viable program within the institution. For example, faculty compensation may be a committed cost because of employment contracts. Discretionary fixed costs (also referred to as managed costs) result directly from policy decisions of management. An example of discretionary cost is preventive maintenance. The incurrence of such costs has no relationship to volume of service, but because of their nature, may be adjusted within a particular costing period.

COSTING AND FINANCIAL ACCOUNTING

In the determination of cost information, there are important relationships between financial accounting and cost accounting that need to be recognized. A financial accounting system is used by all colleges and universities to provide information to administrators, governing boards, and others. The information obtained from this system, however, often cannot completely satisfy the needs for unit cost information. For specific purposes, cost information may be developed by conducting special cost studies, which typically utilize data contained in established financial accounting systems as well as financial and statistical data available from other sources. To meet the repetitive requirements for certain cost information, an institution may expand its financial accounting system or develop supplemental costing procedures. The distinguishing characteristic of cost accounting is the introduction of statistical data to determine unit costs.

A financial accounting system in higher education is based on generally accepted accounting principles and is designed to satisfy the institution's need for recording, collecting, classifying, and reporting financial information. This involves maintaining separate accounts in the financial accounting system for (1) the unrestricted and restricted funds received and expended by the institution; (2) the organizational entities within the institution responsible for expending funds according to budgets; and (3) the objects of expenditures incurred, such as salaries and wages, supplies, and equipment. The classification of different accounts is in accordance with the institution's chart of accounts. Except for the broad classifications of financial accounting information promulgated by authoritative bodies for external financial reporting purposes, the chart of accounts usually varies among institutions. The variations are due in part to differences in institutional characteristics and information requests.

Because a chart of accounts is designed to serve specific purposes, the information obtained from the financial accounting system usually does not satisfy the variety of needs for cost information. Expenditures such as interest on plant indebtedness recorded in certain fund groups for financial accounting purposes may have to be combined with expenditures of other fund groups for cost determination purposes. Furthermore, there are instances where the fi-

nancial accounting system does not include certain costs such as retirement plan expense recorded by a state agency and depreciation expense, which is not required to be recognized by institutions of higher education.

Accounts in the financial accounting system may or may not coincide with cost objectives. In determining cost information, certain accounts in the financial accounting system may require analysis to identify their direct or indirect relationship to a cost objective or to identify their fixed, variable, or semivariable nature. Financial accounting information which cannot be directly identified with a cost objective may need to be allocated as an indirect cost. Similarly, the methods used to charge personnel costs to accounts for financial accounting purposes may not be sufficient bases for identifying costs to a cost objective for cost accounting purposes.

Reconciliation, the process of identifying and giving appropriate consideration to differences in two or more sets of data, should be made between cost information and official financial and statistical information. This reconciliation is necessary because cost accounting systems or special cost studies normally make some use of the following:

1. Costs appearing in different form from that contained in the financial accounting system.
2. Costs unavailable in the financial accounting system.
3. Statistical data available elsewhere in the institution or from other sources.

The reconciliation of these items is necessary to insure the validity of cost information.

As is true with the presentation of a financial statement, cost information reports should be accompanied by a disclosure statement sufficient to provide the reader with the significant costing standards and policies affecting the determination of the cost information for its intended purpose.

COST DETERMINATION METHODS AND APPROACHES

Cost objectives may represent either (1) specific, unique projects or (2) processes producing similar, repetitive services. The costs of such objectives are determined by one or a combination of two methods, namely, the specific service method or the continuous service method. Generally, under the specific service method, costs are accumulated to a specific service or project, while under the continuous service method they are accumulated to a group of similar units of service. In commercial organizations, these methods are referred to as job order and process costing, respectively. Selection of the appropriate costing method is essential if valid costs are to be determined. The continuous service method costs all units at an average as though the units were all uniform. If the services are unique and not uniform, use of the continuous service method would give invalid results.

Associated with these primary methods are three cost approaches, namely, full costing, variable costing, and standard costing, which can be used with both the specific service and continuous service methods.

Specific Service and Continuous Service Methods

Presented below are the characteristics and uses of each primary method, followed by a description of its applicability to institutions of higher education.

Specific Service Method. As the name implies, this cost determination method is used to collect cost incurred for a specific service, which can be identified separately. It is because each unit is unique that cost must be segregated, rather than being identified as part of a continuous process, wherein an average cost can be derived that is representative of each unit of service. In the specific service method, the costs of different units of service are accumulated individually throughout the period during which service is provided. As a result, costs are compiled by each project or job in each organizational unit.

Examples of specific services are research projects, jobs in print shops, and usage of motor vehicles. Each project or job has unique objectives requiring different amounts of personnel effort, goods and services, and other expenses to achieve the result intended when the project was conceived. For this reason the specific service method is used, which identifies costs of each project.

Continuous Service Method. The continuous

service method is useful when the activities being costed consist of similar units of service. In this instance, the service being costed represents a number of uniform units the cost of which can be aggregated to arrive at an average cost per unit for a particular period. Service may be provided by a number of separate organizational units performing standard activities. Costs may be accumulated through various processes or organizational units until all services are completed.

The method for attributing cost under the continuous service method is comparable to the specific service method in that the cost resulting from expenditures or requisitions of supplies is determined on somewhat the same basis. A difference that does exist, however, is that the cost incurred is accumulated by process or organizational entity rather than by individual project.

An example of the use of the continuous service method is a department such as history, providing instructional services to majors in that discipline. Typically, the department also simultaneously provides instructional services to majors of other disciplines such as English and chemistry. Instructional services provided to these different majors are the same when they attend the same courses. Essentially, courses are designed to provide instructional services to students, according to a defined curriculum. Because of these characteristics, a continuous service cost method may be applied to determine a cost per unit of service provided to each student.

Selection of Method. As a general rule, the following guidelines may be employed to select the method to attribute cost:

1. Cost incurred by an organizational unit to provide a uniform service for a particular period should be accumulated as a single cost objective by the continuous service method.
2. Cost incurred by an organizational unit to provide more than one uniform service for a particular period should be accumulated as more than one cost objective by the continuous service method.
3. Cost incurred by an organizational unit with different services that can be separately identified should be accumulated by the specific service method.
4. Cost incurred by an organizational unit to provide one or more uniform services and one or more different services can be accumulated concurrently or in sequence by both the continuous service method and specific service method, respectively.

Cost Approaches

Full, variable, and standard costing, as previously indicated, are approaches to cost determination that are used in conjunction with either of the primary methods discussed previously. Selection of the cost approach is determined by the purpose for which cost information is to be used.

Full Costing. Full costing is defined as the accumulation of all direct and all indirect costs attributed to units of service. The full costing approach permits the user of cost information to examine the total cost of units of service as well as direct and indirect components of cost that make up the full cost. The full costing approach requires that all direct costs and an appropriate share of indirect costs incurred by an organizational unit (such as an academic department) be included as the cost of units of service. Other indirect costs incurred by the institution also must be considered when determining full cost. These include indirect support activity costs, such as the cost of the president's office and operation and maintenance of plant, which cannot be attributed directly to the units of service being costed.

Full costs also include depreciation expense. Depreciation expense is that portion of the cost of limited-life capital assets (buildings and equipment) which expires during a period. In higher education, financial accounting standards do not require recognition of depreciation; however, if an institution chooses to determine full costs, provision should be made for depreciation expense. There are instances when an institution, in accordance with its costing purposes, may desire to exclude expired capital costs, but the results would not represent full costs.

Full costs also should include direct benefits of a material nature provided by an outside organization, such as pension expense incurred by a state, but not recorded in an institution's financial records.

In colleges and universities, information derived from the full costing approach may be used to compare and examine periodically the cost and revenue per unit of service provided. Full cost information may assist in (1) determining whether tuition, fees, appropriation requests, and revenues from other sources warrant adjustment and (2) evaluating whether funds expended produced the benefits anticipated. Full-cost procedures should be used for cost determination of sponsored projects.

Variable Costing. Variable costing recognizes as the cost of services provided only those costs which are variable, that is, those costs which change when changes occur in service volume or mix. Costs that remain constant, regardless of the number of units of service provided, are referred to as fixed costs.

Full costing encompasses the assignment of all costs, regardless of their variability to the units of service provided, whereas variable costing assigns only those costs that vary with volume or mix. Variable costs include those direct and indirect costs that vary with the number of units of service provided or within a range of activity.

In using the variable costing approach, costs incurred by an organizational unit are classified as either fixed or variable. For instance, if a program were to be added or eliminated, it would be necessary to determine how the costs of faculty salaries, departmental administrative salaries, and supplies would vary as a result of an increasing or decreasing number of units of service to be provided. Aggregate faculty salary cost may increase because additional sections may be required for a new program. If a program is eliminated, faculty cost may or may not decrease, depending on tenure conditions and on existing contractual obligations to nontenured faculty members. In the case of departmental administration, salary cost may be fixed because an anticipated increase or decrease in units of service may not require a change in administrative effort. On the other hand, cost of supplies may vary depending on the number of units of service. Determining the expected variability of these elements of cost is important in examining the financial implications of decisions being considered.

Variable costing is of particular import to an institution when the typical "what if" questions are asked. For instance, the financial impact of different alternatives under consideration might involve the following questions:

1. What if an academic program is expanded or contracted?
2. What if faculty salaries are raised?
3. What if average class size is increased or decreased?
4. What if the number of chemistry and history courses are reduced, with a corresponding increase in the number of English courses?
5. What if enrollments increase or decrease?

Standard Costing. Standard costing uses predetermined unit costs, which are compared with actual unit costs to identify variances. For example, in analyzing operation and maintenance of plant, variances from standard costs assist in focusing attention on variations from plan or budget and in determining corrective action to be taken. Standard costing is also useful in preparing plans and budgets for both management and those performing the work.

INDIRECT COST ALLOCATION

This section describes the considerations involved when indirect costs are to be allocated to cost objectives.

Indirect Cost Pools

Indirect cost pools are established for the purpose of allocating costs on a common allocation basis to a group of cost objectives benefiting from or causing the incurrence of the indirect cost. Indirect costs may be aggregated into pools by (1) organizational unit or cost center; (2) expenditure object, such as fuel and electricity; or (3) other categories. The number and composition of indirect cost pools relate to the characteristics of an individual institution. Factors used in determining indirect cost pool classifications include the purposes for which cost information is to be used, characteristics of the cost objectives being costed, complexity of the organization, and degree of accuracy needed.

Equitable Allocations

Cost accumulated in indirect cost pools should be allocated to cost objectives in an equitable

manner. An equitable allocation basis relates to the benefits received by the cost objective or to the activities of the cost objective that logically and reasonably caused the cost to occur.

Selection of Allocation Bases

The bases selected for allocating indirect costs should be quantitative measures that can be applied in a practical manner. Such measures may be total direct costs, direct salaries and wages, square feet of space occupied, population of students and/or faculty served, or others as appropriate for the particular cost pool being allocated. The measure selected can be developed as part of a system designed to collect statistical data throughout the period or as a result of a special study.

The measure selected for distributing indirect cost should be one that will result in the most equitable allocation of indirect cost to the cost objective within the realm of practicability. After considering the purpose of cost determination, the most equitable method may not be the most reasonable in terms of both time and cost involved in collecting and tabulating quantitative data. For this reason the most practical cost distribution base should be employed, provided the result will not be materially different from a more complex alternative.

Common Cost

In processes in which two or more services are provided simultaneously, common costs occur in providing these services. In order to allocate equitably the common cost incurred in a single process to the services provided, a determination of the interrelationship between or among the two or more services involved in a given cost objective must be made. When the services are of similar importance, the process may be referred to as a joint service. Alternatively, when one service is incidental to the other, the process is one of primary-secondary service. This distinction and analysis should be made so that cost incurred in the process can be distributed equitably to the joint services or the primary-secondary services.

Joint Services. Joint services have one or more of the following characteristics:

1. The services are complementary in the sense that providing one results in providing the other.
2. The services are substitute in the sense that increasing one decreases the other.
3. The services are independent in the sense that there is no relationship between or among them except that it is less costly to provide them together rather than separately.

Allocation of cost to each of the joint services is based on a method that treats each service equitably by proportional distribution of cost. For instance, joint service cost may be allocated to the resulting services on the basis of units of each service.

One of the most difficult problems in determining joint service costs is the inseparable nature of many joint services. For example, the research function is an integral part of the instruction function, particularly at the graduate and professional levels. Medical schools have a very complex joint service problem arising from the inseparable nature of instruction, research, and patient care. In such situations, any separation of cost for joint services usually will be subjective.

Primary-Secondary Services. Primary services (main services) are the principal services of the process being costed. Secondary services (by-product services) are produced with a primary service and by the same process. The distinguishing characteristic of a secondary service is its minor importance in relation to the primary service.

Allocation of costs applicable to secondary services is handled in one of two basic ways.

1. No cost allocation is made to the secondary service, and revenue derived therefrom, if any, either is used to reduce the cost of primary service or is treated as other revenue, with no reduction in the cost of primary service.
2. Appropriate costs are allocated to the secondary service.

An example of primary-secondary services would be the academic services of a forestry school and the related forest products available for disposal. Such products are often sold to outside users, but are not a primary reason for the institution to have the forestry school. In this case, no cost would have to be allocated to the

secondary service, with earned revenue either used to reduce the cost of primary services or treated as other revenue. As an alternative, a portion of the total operating cost of the forestry school may be allocated to the secondary service.

COST ANALYSIS

Once the purposes of obtaining cost information have been identified and costs have been determined, cost analysis can be performed. The act of performing cost analysis involves the examination and evaluation of costs and related statistical information in order to determine the implications of past, present, and future actions. Although cost analysis can consider past and present actions alone, one of its major uses is that of providing cost information concerning alternative opportunities available and assisting in the selection of those alternatives considered appropriate.

In performing cost analysis in higher education, it may be important in certain cases to differentiate between expenditures financed from restricted funds and those financed from unrestricted funds. This distinction must often be considered when using cost information because restricted funds can be used only for specific purposes and can be terminated at a specific time or at the completion of an activity. Where these factors are of some significance to institutions having large amounts of sponsored projects or restricted grants, it may be useful for unrestricted and restricted costs to be separately identified throughout the cost determination process. For more information on restricted and unrestricted funds, refer to the chapter "Current Funds." (See Publisher's Note on page 19.)

While there are innumerable analyses that may be made of cost information, three basic categories of cost analysis are full cost analysis, cost-volume-revenue analysis, and controllable cost analysis. The particular category of cost analysis to be applied is a chief factor in the selection of one of three costing approaches—full, variable, and standard costing.

Full Cost Analysis

Full cost analysis involves the process of examining and evaluating the total cost attributable to a cost objective. This type of cost analysis may be useful in establishing funding and price structures in higher education for such items as tuition and fees, appropriation requests, and recovery of grant and contract costs. It also may be used in examining and evaluating the historical cost performance of activities and in cost benefit analysis. In utilizing full cost analysis, it is generally useful to consider the component parts of full costs.

It should be noted that the use of average cost per unit of service in full cost analysis is limited for projecting future costs because cost variations resulting from volume changes do not follow the average. More than likely, future average costs will indeed be different from the present level, as the mix changes and the number of units provided increases or decreases. When costs are to be used for projections, it is necessary to consider the fixed and variable nature of the cost components.

Cost-Volume-Revenue Analysis (Differential Analysis)

Cost-volume-revenue analysis involves the relationship among the cost of service, number of units of service provided, and revenue derived from providing such service. This type of analysis presents the financial results anticipated for particular levels of activities or alternatives being considered. Emphasis is placed on examining cost, volume, and revenue, which can be different for alternative activities and for varying levels of units of service provided. For instance, instructional cost in a college or university is affected by changes in student requirements, course offerings, section size, cost of goods and services purchased, and teaching loads. Revenue is affected by the number of students enrolled, tuition and fee rates, and other factors. Since all costs do not vary with volume, analysis is required to identify variable and fixed costs. The variable costing approach to cost determination described earlier is used to perform this type of analysis. Cost-volume-revenue analysis assists in determining the effect of alternatives on revenue and cost.

Differential cost-revenue analysis (often referred to as incremental analysis) is a type of cost-volume-revenue analysis that assists in mak-

ing choices among various volume alternatives. Differential costs and revenues are costs and revenues expected to change as a result of changes being considered in existing institutional activities. They are the summation of a series of marginal costs and revenues. Marginal cost and revenue refer to the change resulting from the addition of one unit of service.

Emphasis in differential analysis is directed toward examining those cost and revenue elements that will change and the changes in the amount of cost and revenue that will occur as a result of selecting one alternative over another. Similar useful analysis can be performed by relating changes in cost to changes in volume without reference to revenue changes.

Controllable Cost Analysis

Controllable cost analysis, which uses information normally derived from an institution's financial accounting records, involves the examination of those costs that are the assigned responsibility of the manager of an organizational entity. In institutions of higher education, as in other organizations, controllable costs are related to organizational entities so that accountability for the use of resources is identified with a manager.

In this analysis, actual costs are compared to projected (budgeted) or standard costs to determine variances. Analysis may indicate that variances were caused by the actions of a manager, and thus it may be determined that the manager should adjust subsequent expenditures to insure conformance to budgeted cost. Where variances resulted from circumstances beyond that manager's control, the causes may be attributed to: (1) volume changes, such as an increase or decrease from that planned in the number of students requiring room and board; (2) institutional policy decisions requiring a different level of service than originally intended; or (3) the environmental effect on cost, such as that experienced with rapidly changing utility rates. Variances caused by these factors may necessitate an adjustment in the manager's budgeted cost so as to establish a new level of controllable cost, which the manager is responsible for achieving.

COSTING ISSUES

Cost data of various kinds are being used more than ever by colleges and universities for internal management purposes. Furthermore, external agencies, such as state legislatures and local government bodies, increasingly are turning to cost-based formulas to determine the level of funding to be provided to institutions. An important question for both internal and external parties is: How can more and improved cost information be provided in a way that will improve the decision-making process in higher education? Before this question can be answered conclusively, a considerable amount of research should be performed.

This section describes the more significant cost determination issues facing higher education. Some of these issues require extensive definition, testing, and validation of results before they can be resolved.

Quality and Efficiency

There is considerable interest in finding ways to appraise the quality of educational programs in higher education; however, there are no generally accepted measures of quality. Some factors that may affect the quality of educational programs have been identified as the academic ability of students, the effectiveness of faculty, the financial support for programs, and the availability of physical facilities. While there may be a relationship between cost and quality, it is not appropriate to measure quality by using cost information.

There is also interest in measuring the efficiency of educational programs; however, no acceptable measures are available. Some institutions attempt to use average class size data, student credit-hours-taught data, and classroom utilization data as measures of efficiency.

Judgment is often introduced as a substitute for quantifiable measures of quality and efficiency. Such judgment can be based on prior experiences, defined educational priorities, student and faculty demands, and other factors influencing decisions concerning educational programs. It is inappropriate for users of cost information to assume that the higher the cost of

a particular program, the higher its quality; or the lower the cost of a program, the greater its efficiency. The cost of a program cannot be assumed to be a measure of its quality or efficiency.

Faculty Time and Effort Reporting

There is a long-standing issue in determining costs in higher education, which involves the appropriate distribution of faculty time or effort to the instruction, research, and public service functions. This distribution is necessary to attribute compensation cost to those functions benefiting from faculty activities.

The first aspect of this issue involves the use of time or the use of effort information as the basis for making a cost distribution. Time involves the number of hours expended, while effort involves the intensity of activity. If the distribution of faculty compensation is based on time information, cost results probably will be different from what they would be if the distribution were based on effort information.

Another aspect in faculty time or effort reporting involves the question of common cost. This difficulty can best be illustrated by the example of a professor who has a sponsored research project and in the conduct of research also provides instructional assistance to a graduate student enrolled in one of his courses. The issue is one of distributing the professor's time or effort to determine the cost of instruction and the cost of research when they occur simultaneously. A possible resolution of this issue lies in reaching consensus on a procedure for an equitable assignment of faculty time or effort. Such a resolution may well be subjective, however, and would require acceptance by a number of concerned groups, including those outside the institution who provide funds.

Costing Units

While it is possible to measure the inputs of higher education activities, there is no general agreement on the definition of measures of output for instruction, research, and public service. In the absence of acceptable output measures, many institutions have substituted measures of the process for costing units.

The definitions of costing units may vary within an institution and from institution to institution, which results in variations in unit cost information. For instance, within a university a general definition of the semester credit-hour may be established, but a particular school in the same university may decide to use a different credit-hour definition for its own purposes. Similarly, the definition of the student credit-hour can vary among institutions depending on whether they are counted at registration, after the drop/add period, or at the end of the semester. These costing unit difficulties will have to be resolved in order to report cost information in a uniform manner.

Formula Funding

Much attention has focused on the development of unit cost information as the basis of formula funding from government agencies. Many state legislatures and local government bodies are asking basic questions such as: How much funding is required for higher education and how should funds be allocated, recognizing that institutions provide different programs and services?

A number of states and local governments have attempted to resolve such questions by developing allocation formulas that involve numerous factors, including unit cost information. The equitableness of allocations resulting from these formulas depends on how well the formulas approximate the real funding needs of the institution, as well as the accuracy and validity of the data used in these formulas. It must be recognized that programs with similar titles may have significantly different costs because of differences in terms of purpose, scope, quality, and efficiency. Analysis of program differences, including cost and non-cost aspects, should be a factor in the development and use of a formula if the resulting distribution of funds is to be equitable.

Interinstitutional Comparisons and Analyses of Cost Information

Some institutional administrators and certain external agency representatives have suggested

that interinstitutional comparisons and analyses of cost information are useful for evaluating programs and related activities and for allocating resources both within and among institutions. In using cost in this manner, however, it is evident that there are differences among institutions of higher education that affect the validity of cost information for comparison purposes. These differences may be classified as methodological or functional. When performing a cost study for purposes of interinstitutional cost comparisons and analyses, it is necessary to attempt to eliminate methodological cost determination differences so that the resulting cost information highlights only functional differences.

Methodological differences result from costing procedures that are not uniformly applied. Typical examples of methodological differences are the following:

1. The judgments exercised in collecting, estimating, and allocating costs differ since they often depend on the interpretation of complex situations and on the unique characteristics of individual institutions. For instance, experience has indicated that there are no generally accepted bases suitable for all allocations of indirect cost.
2. The definition of direct and indirect cost can be different from institution to institution, depending on the ability of an institution to identify cost as direct.
3. The methods used to accumulate and analyze cost may differ from institution to institution.

Functional differences principally result from differences in programs and related support activities. Identifying the actual cause of such differences among institutions requires an analysis of the characteristics and content of programs being compared. The following are examples of functional differences affecting the comparison and analysis of cost information:

1. Missions, goals, and objectives differ among institutions.
2. Quality and efficiency of the educational process differ among institutions.
3. Organizational structure, activities, and units of service costed differ from institution to institution.
4. Constituents served by institutions have different needs and, therefore, require different education services.
5. Different geographical locations of institutions cause cost for similar items to vary.
6. Distinct differences exist between those institutions which are well established and those which are developing.
7. Economies of scale may be available to a larger institution and not to a smaller one.
8. Variations in costs occur because of differences in the availability of funds.

If methodological differences can be eliminated and true functional differences identified, the question remains as to how cost information should be used internally by management and externally by government agencies. Can adequate analysis of the relationship of differences in cost to functional differences be developed to permit valid and equitable decisions? Comparative analysis is less difficult when dealing with like institutions, but becomes progressively more difficult as comparisons are made among dissimilar institutions. Much study is required to prove the utility of interinstitutional cost information.

COSTING STANDARDS

The term "costing standards" as used here refers to principles that should be applied in determining cost. Costing standards constitute the framework or foundation on which costing is performed. Because costing standards are basic definitions of how costs should be determined, they provide a better understanding of the meaning and applications of costing.

Costing standards facilitate a more consistent determination of cost; however, the application of these standards will not insure uniform determination of cost information, because judgmental and other factors are involved in the costing process. Costing standards provide criteria for the selection of costing alternatives that are valid in terms of their justification of cost accumulation and allocation within a conceptual foundation of cost accounting theory.

The development of costing standards is an evolving process and additional standards may be added from time to time as more study is given to this complex subject.

Costing Standard #1

THE PURPOSES FOR WHICH COST INFORMATION IS TO BE USED SHOULD DETERMINE THE FRAMEWORK WITHIN WHICH COST INFORMATION IS DEVELOPED

Costs are determined to satisfy specific purposes for which cost information is needed. A clear definition of these purposes is needed in order to specify the cost determination approach to be used.

Costing Standard #2

COST INFORMATION SHOULD BE BASED ON THE ACCRUAL METHOD OF ACCOUNTING

Two methods of determining cost are the cash basis method and the accrual basis method. The cash basis method of accounting recognizes expenditures when cash is paid, whereas accrual accounting recognizes expenditures when materials are used and services are performed. To provide valid and consistent cost, the accrual method of accounting should be used, applying the concept of materiality.

Costing Standard #3

COST DATA SHOULD BE RECONCILABLE TO OFFICIAL FINANCIAL ACCOUNTING DATA

Reconciliation to official financial accounting records is necessary to insure the validity of cost records. (Reconciliation is the process of identifying and giving appropriate consideration to differences in two or more sets of data.)

Costing Standard #4

NONFINANCIAL DATA SHOULD BE RECONCILABLE TO OFFICIAL INSTITUTIONAL RECORDS

Reconciliation of nonfinancial data to the official records of the institution is necessary to insure the validity of cost data when such nonfinancial data are used in the cost determination process. (Reconciliation is the process of identifying and giving appropriate consideration to differences in two or more sets of data.)

Costing Standard #5

DEFINITIONS USED IN COST DETERMINATIONS SHOULD BE APPLIED UNIFORMLY

Uniform definitions should be employed during the cost determination process and from period to period to achieve reliable cost information.

Costing Standard #6

COST INFORMATION AND RELATED COSTING UNITS SHOULD COVER THE SAME PERIOD

Cost determination for a particular period should be related to the units of service provided during that same period.

Costing Standard #7

COST INFORMATION SHOULD BE CONSISTENTLY DETERMINED

Cost information used in any cost study must be consistently determined for all periods included and for all organizational units included. Cost data will not be comparable unless consistently determined. Consistency depends on uniform definitions, methods, and interpretations as well as judgments exercised in the cost determination process.

Costing Standard #8

COST SHOULD BE ATTRIBUTED TO A COST OBJECTIVE BASED ON A CAUSAL OR BENEFICIAL RELATIONSHIP

Meaningful and dependable cost determinations require that costs be assigned to cost objectives according to identifiable relationships that logically and reasonably cause the cost to occur or that result in benefits received by the cost objective.

Costing Standard #9

INDIRECT COST SHOULD BE ALLOCATED BASED ON QUANTITATIVE MEASURES THAT CAN BE APPLIED IN A PRACTICAL MANNER

The bases of allocation of indirect cost should involve the use of those quantitative measures which best represent the relationship of cost to the cost objective, with the result that indirect costs are equitably distributed. There are instances when the most equitable distribution may not be the most practical, both in terms of time and related expense involved in collecting and tabulating quantitative measures. In such cases, the most practical measure should be selected, provided the results are not materially different.

Costing Standard# 10

COMMON COST INCURRED TO PROVIDE TWO OR MORE SERVICES SHOULD BE ALLOCATED IN AN EQUITABLE MANNER

Allocation of common costs to joint services, which are cost objectives, should be based on a logical relationship of the several services to one another and to the nature and circumstances of the costs incurred. It should be recognized that separate costing of jointly produced services is subjective and the bases available to allocate joint costs are arbitrary.

Costing Standard #11

CAPITAL COST OF A COST OBJECTIVE SHOULD REFLECT THE APPLICABLE EXPIRED CAPITAL COST OF THE PERIOD

Capital cost of a cost objective should reflect applicable expired cost determined on the basis of the estimated useful life of the asset being depreciated.

Costing Standard #12

COST INFORMATION SHOULD BE ACCOMPANIED BY A DISCLOSURE STATEMENT

Explanatory disclosures necessary to provide the user with a clear understanding of the previously established, intended use of cost information should accompany the reporting of such information. Disclosures should encompass the costing method and approach used, the cost definition used, the types of cost included, identification of cost objectives and costing units, and other information pertinent to the cost determination effort.

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The Service touches all areas of administration that are related, directly through the business or financial officer or implicitly because of their impact on finances and resources, to the centers of management decision in the institution. It is addressed, in general, to the chief business or financial officer and to others having substantial responsibility for fiscal planning, for allocation of resources, or for determining management policies of the institution.

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